

FCC ID: RE81300227T

Technical Description :

The brief circuit description is listed as follows :

- U1 MF-T1B and associated circuit act as transmitter (Encoder & Modulator).
- Y1 and associated circuit act as 27.145 MHz Oscillator.
- U2 W588S006 and associated circuit act as Microcontroller.
- FW_M1, BW_M1, FW_M2, BW_M2, FW_M1M2, BW_M1M2, Fire_Control, UP_Helicopter, Down_Helicopter and FW_Helicopter and associated circuit act as Control Key.
- Q1, Z1 and associated circuit act as Voltage Regulator.

Antenna Used :

An extendable antenna has been used.

General Description

RF Electronics MF-T1B is a fully integrated S-R (Super-regeneration) RF transmitter with full-function of baseband command encoder for application of R/C vehicle, toy, or wireless data communication.

MF-T1B provides both **uC-mode** for general purpose of micro-controller programming interface and **manual-mode** for RF transmitter as well as 6-function of baseband command encoder.

MF-T1B cooperate with MF-R1B is very easy and convenient to provide simple remote control

function with very low production cost in various application. The transmitter provides the FCC/ETSI regulation provisions for 27M, 35M, 40M, 49MHz S-R (Super-regeneration) modulation. Wide range of operation voltage from 2.2V to 5.5V is suitable for 2-battery or 3-battery R/C toy application, and high efficient transmission output power.

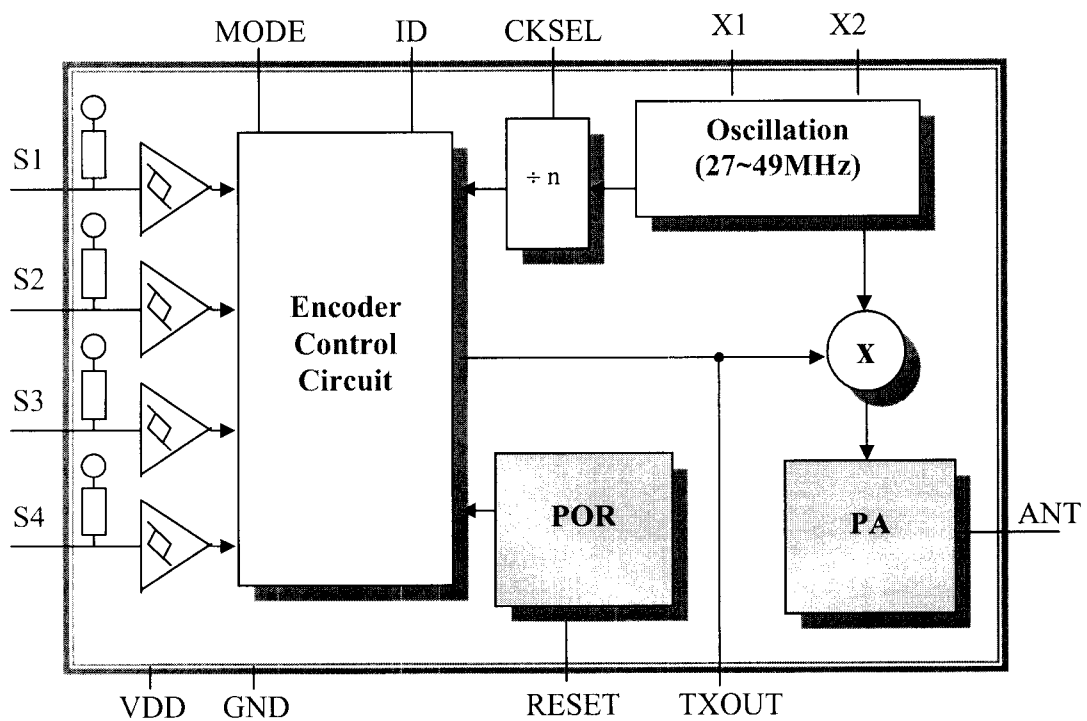
MF-T1B is compliant to FCC part 15 class B and 15.227 / ETSI 300 220-1, making it easier for wireless end products to get FCC and ETSI compliance approval.

1.1 Features

- ❑ Operating frequency: 27MHz ~ 49MHz
- ❑ Wide operating voltage: 2.2V ~ 5.5V
- ❑ Transmission data rates up to 10K bps (uC- mode) for 30%-70% duty cycle
- ❑ High efficiency transmission output power.
- ❑ **Manual-mode** supports 6-function of R/C toy baseband control command encoder, i.e, Forward, Backward, Left-turn, right-turn, and 2 user defined function F1 and F2
- ❑ High efficient transmission power with minimum current consumption
- ❑ Power down current consumption less than 1uA
- ❑ Less manual adjustment needed in production
- ❑ Fewer external components required in production
- ❑ Lower manufacture production cost
- ❑ Compliant to FCC part 15 class B and 15.227 / ETSI 300 220-1 low-power & short-range device requirements
- ❑ Two input modes for flexibility of more control function and lower component cost
- ❑ Dice form available for PCB bonding
- ❑ Operating temperature: 0°C ~ 70°C

System Description

2.1 MF-T1B System Block Diagram



2.2 MF-T1B Functional Description

MF-T1B provides two operation modes for convenient remote control product development, named **Manual-mode** and **uC-mode**. The **Manual-mode** provides a powerful baseband command encoder, which perform 6-function binary data encode and, modulate with the on-chip RF power amplifier to transmit control command. The control function can be at most to 6 functions, **Forward**, **Backward**, **Left-turn**, **Right-turn** for general R/C-vehicle control and 2 other user-defined functions **F1** and **F2**.

It is very suitable for remote control applications if MF-T1B and its associated receiver/decoder MF-R1B are adopted. The very pair provides extremely low-cost and high-performance function for design of various remote-control applications.

The **uC-mode** provides digital interface for external micro-controller to control the transmitter easily and efficiently. The micro-controller only need two pins, **TXD** (S1) to send data and **ENB** (S2) to enter power down mode, if needed.

The transmitter provides the FCC/ETSI regulation provisions for 27M, 40MHz and 49MHz S-R (Super-regeneration) modulation. Wide range of operation voltage from 2.2V to 5.5V is suitable for 2-battery or 3-battery R/C toy application, and 15dBm high efficient transmission output power.

MF-T1B Super-regeneration RF transmitter is compliant to FCC part 15 class B and 15.227 / ETSI 300 220-1, making it easier for wireless end products to get FCC and ETSI compliance approval.

Electronic Characteristics

3.1 MF-T1B Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage to Ground Potential	- 0.3 to 6.5	V
Applied Input/Output Voltage	- 0.3 to 6.5	V
Power Dissipation (T _a = 70°C)	150	mW
Ambient Operating Temperature	0 to 70	°C
Storage Temperature	-40 to 85	°C

Note: Exposure to conditions beyond those listed under Absolute Maximum Ratings may adversely affect the life and reliability of the device.



1. GENERAL DESCRIPTION

The W588Sxxx is a powerful microcontroller-based speech synthesizer with 3 channels of speech and melody for multi-tasking applications.

The W588Sxxx provides slow mode operation and PWM output to help reduce the power consumption for longer battery life. Also, the W588Sxxx adopts the MDPCM, ADPCM or PCM algorithm to reproduce high quality sound outputs.

Other powerful functions like IR carrier generation and event synchronization mechanism are provided to meet the requirements for more complicated multi-tasking applications.

The W588Sxxx family contains several items with different playback duration as shown below: (@5-bit MDPCM algorithm, 6KHz sampling rate)

ITEM	W588S003	W588S006	W588S010	W588S013	W588S016
*Duration	4 sec.	7 sec.	12 sec.	16 sec.	20 sec.
ITEM	W588S020	W588S025	W588S030	W588S040	W588S050
Duration	25 sec.	29 sec.	32 sec.	50 sec.	58 sec.
ITEM	W588S060	W588S080	W588S100	W588S120	-
Duration	66 sec.	100 sec.	118 sec.	133 sec.	-

**ITEM	W588S009	W588S012	W588S015
Duration	12 sec.	16 sec.	20 sec.

Note:

*: The duration time is based on 5-bit MDPCM at 6KHz sampling rate. The firmware library and program code have been excluded from user's ROM space for the duration estimation.

** : W588S009, S012 and S015 are a little different in RAM and I/O definition. Meanwhile, PowerScript™ dose not support either.

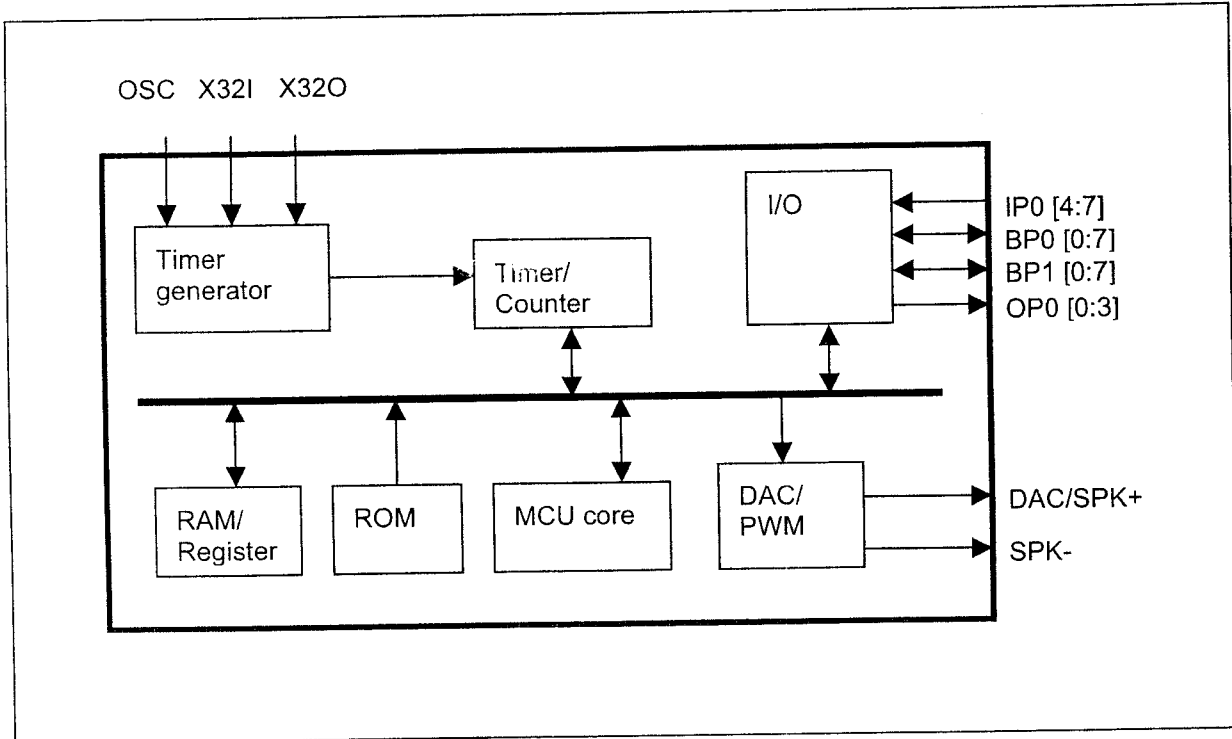


2. FEATURE

- Wide Operating voltage: 2.4 ~ 5.5 volt
- Build in 8-bit MCU core with powerful programmable capability
- System clock
 - 4 MHz at 2.4 ~ 5.5 volt
 - 8 MHz at 3.6 ~ 5.5 volt
- F/W speech synthesis
 - 5-bit MDPCM, 4-bit ADPCM or 8-bit PCM algorithm can be used
 - Programmable sample rate
- Direct-drive PWM output to save power consumption (no support in W588S003 and W588S006)
- Built-in 3 timers for speech/melody synthesis and general purpose applications
 - 2 speech channels
 - 1 speech channel plus dual-tone melody
 - 2 voice melody channels
- Build in on-chip mixer
- Built-in 32 KHz crystal oscillator with divider for time-keeping application
- Provide Watch Dog Timer (WDT)
- Provide power management to save current consumption:
 - 4 ~ 8 MHz system clock, with Ring type oscillator
 - Slow mode to reduce power
 - Stop mode for stopping all IC operations
- I/O configuration
 - W588S003 ~ W588S120: 16 I/O
 - W588S009, W588S012, W588S015: 4 In, 8 I/O, 4 Out
- Shared ROM for voice, melody and program storage
- Provide IR carrier generation
- Built-in Serial Interface Manager (SIM) in W588S080 ~ W588S120
- Support **PowerScript™** for developing codes in easy way. (No support in W588S009, S012, and S015)
- Full-fledged development system
 - Source-level ICE debugger (Assembly & **PowerScript™** format)
 - Event synchronization mechanism
 - Compatible with W566B/C & W567S system
 - User-friendly GUI environment
- Available package form:
 - COB is essential
 - W588S003 ~ W588S120: LQFP48
 - W588S009, S012, S015: QFP44



4. BLOCK DIAGRAM



Notes:

1. IP0 and OP0 are only providing in W588S009, W588S012 and W588S015.
2. BP1 is no providing in W588S009, W588S012 and W588S015.
3. PWM is no providing in W588S003 and W588S006.

5. ELECTRICAL CHARACTERISTICS

5.1 Absolute maximum ratings

PARAMETER	SYMBOL	CONDITIONS	RATED VALUE	UNIT
Power Supply	VDD-VSS	-	-0.3 to +7.0	V
Input Voltage	VIN	All Inputs	VSS -0.3 to VDD +0.3	V
Storage Temp.	TSTG	-	-55 to +150	°C
Operating Temp.	TOPR	-	0 to +70	°C

Note: Exposure to conditions beyond those listed under Absolute Maximum Ratings may adversely affect the life and reliability of the device.